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I, JULIE BILLINGSLEY, TEAM LEADER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. 2003903585 for a patent by YARRA RIDGE PTY LTD as filed on 10 July 2003.



WITNESS my hand this
Fourteenth day of July 2004

JULIE BILLINGSLEY
TEAM LEADER EXAMINATION
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PROVISIONAL APPLICATION

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Title

A cabinet lock

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The following statement is a full description of this invention, including the best method of performing it known to me:-

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Field of the Invention

This invention relates to locks for displaceable wings.

Definitions and Conventions Employed

5 This specification describes LOCK/S (as defined below) substantially as described herein with reference to and as illustrated in the accompanying drawings.

10 Throughout this specification and claims which follow, unless the context requires otherwise, the word "comprise", or variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated integer or group of integers but not the exclusion of any other integer or group of integers.

 Throughout this specification and claims which follow, unless the context requires otherwise, the positional prepositions such as rear, forward are used to assist in description of the preferred embodiments and with reference to the accompanying drawings and have in general no absolute significance.

15 Throughout this specification and claims which follow, unless the context requires otherwise, the words cabinet and wing embraces both displaceable doors and windows and the word door embraces wings.

 Throughout this specification and claims which follow, unless the context requires otherwise: **latching** means displacement of the **latch-bolt** against biasing means by an engageable means (in one form comprising a **strike plate**) and subsequent displacement of the latch-bolt into engagement with the engageable means (in one form comprising an **aperture** of the strike plate) under the action of the **biasing means**; **latch-bolt** is an outwardly biased bolt capable of executing latching; **auxiliary bolt** means an outwardly biased plunger that is operably associated with the latch bolt; **unlatching** means withdrawal of the latch-bolt from engagement with the engageable means; **unlatching lever** is a lever or knob that is hand operable to cause the latch-bolt to become disengaged; **locking means** configuring the lock to restrain it from becoming unlatched; **deadlocking means** means means to configure the lock to restrain the latch-bolt from being displaced from the configuration that it assumes when engaged with the engageable means (in the case of a rectilinearly displaceable bolt it assumes a fully extended position when engaged with the engageable means); **deadlatching** refers to automatic deadlocking of the bolt during latching of the bolt – i.e. the bolt becomes deadlocked as a result of latching; **remote-lock** means a locking means disposed from the lock that includes a remote bolt that is operably connected to the lock – often there is an upper and a lower remote-lock situated above and below the lock; **french door** means a door comprising a hollow frame with a glass in-fill where the hollow within the frame is

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comparatively small in depth, and **security doors** means a door comprising a hollow framed with an in-fill where the hollow within the frame is comparatively small in depth and in width - some security doors having a close weaved infill material, some having expanded aluminium mesh; **lock-body** is the lock portion fitted within the hollow frame of the wing; **depth of lock-body** is the extent of the lock body in a direction parallel to the face of the door; **width of lock-body** is the extent of the lock body in a direction at right-angles to the face of the door; **free-rotation-cylinder** (also called a free-movement-cylinder) is a cylinder comprising a key operable barrel within a **cylinder housing** connected to a **first cam** (in one form [and commonly] having a radially protruding arm) with free movement, said free-rotation-cylinder preferably comprising a **double cylinder** sub-assembly comprised of opposed barrels each connected with free movement to the same first cam such that the cam is free (between limits) to be angularly displaced while the barrels remain undisplaced.. This type of (free rotation) cylinder is commonly used in security door locks in Australia – it enable the cam to be displaced by either barrel to a locking configuration and then the barrel to be reverse rotated to an undisplaced position enabling key removal while leaving the cam in the locking position. This type of cylinder is distinct from more commonly used double cylinders that employ clutches and that do not have free rotation between the barrels and first cam.

This and the other provisional applications cited in the complete applications associated with this provisional describe inventions comprising improved **complete locks** for displaceable wings and **improvements for locks** for displaceable wings, for convenience referred to herein as “**LOCK/S**” – the improvements being transportable into other locks and locking devices without being limited to the complete locks described herein.

Description of the Figures

Fig 1 describes a schematic side view of a lock body with the operating lever superimposed in a pre-latching configuration,

Fig 2 is the lock of Fig 1 in the latched configuration,

Fig 3 is the lock of Fig 1 in the locked configuration,

Fig 4 is the lock of Fig 1 in the unlatched configuration,

Fig 5 is the lock of Fig 1 in the where the lever has displaced rods to operate remote locks configuration.

Description of the Preferred Embodiments

Integers include a **bolt 1** and a **casing 2**,

said casing in some forms comprising a substantially hollow **box-like member 3** having a **face plate 4** attached to the casing by **screws 5** having passage through **apertures 9** while in other cases again, a **spacer** member is inserted between the separate face plate and casing to provide a lock of increased backset in which case the bolt and auxiliary bolt are of extended length.

said bolt preferably comprising a **first portion 11** (being a substantially prism-like solid) that is displaceable from the casing (by having passage through a **bolt aperture 12** in the face plate) and a **return portion 13** within the casing by which the bolt is supported, the upper and lower edges of the aperture are preferably substantially **semi-circular 15** in form to provide increased face plate strength and the upper and lower edges of the bolt are configured to conform to the aperture profile,

said bolt in some forms comprising an outwardly biased latch bolt that in some forms has a **leading end 14** portion profiled on both sides to accommodate both left hand and right hand doors wherein the leading end has curved, chamfer or otherwise profiled sides to facilitate or assist latching wherein the latch bolt is engageable on either side by a strike plate **curved wing** to be inwardly displaced by the strike plate during latching whereby to be and suitable both left hand and right hand hinged doors.

In some forms the bolt is deadlockable such that it cannot be displaced from the extended position by external forces.

Integers include an outwardly biased **auxiliary bolt 16** preferably comprising a **first portion 21** (being a substantially prism-like solid) that is displaceable from the casing (by having passage through a **bolt aperture 22** in the face plate) and a **return portion 23** within the casing by which it is supported, the first portion in some forms has a leading end profiled on both sides to accommodate both left hand and right hand doors wherein the **leading end 53** has curved, chamfer or otherwise profiled sides to facilitate or assist latching wherein the latch bolt is engageable on either side by a **strike plate curved wing** to be inwardly displaced by the strike plate during latching whereby to be and suitable both left hand and right hand hinged doors.

The return portion 23 has an **engaging shoulder 17** protruding towards an **engageable shoulder 19** of a **pseudo-deadlocking slide 205**. The engageable shoulder is displaced from the bolt by inwards displacement of the auxiliary bolt to thereby release the bolt to displace to the fully extended position. This arrangement is used to restrain the latch-bolt in a partly extended position shown in Fig 1 prior to latching to facilitate latching of a bolt that otherwise would protrude too far to be

latched i.e. if fully extended it would protrude beyond the curved lip of a conventional strike plate. The auxiliary bolt is outwardly biased by **spring 24**. The deadlocking slide has a **leading end shoulder 201** that is engageable in recess 202 of the bolt and it is urged towards this engagement by spring 203

5 Integers further include a forked **unlatching rocker 20** comprising an angularly displaceable member supported at a **pivotal axis 25** defined by a **pinned extension 26** of the casing side wall 27, while the **first arm 28** extends (from the pivotal axis) **upwardly** to terminate in a **engageable shoulder 28A** while the **second arm 32** extends **downwardly 34** to overlap the return bolt portion 13 to be operably
10 connected to the bolt such that the bolt is inwardly displaceable by angular displacement of the unlatching rocker. Preferably, the overlapping arm portion includes a sideways protruding **drive pin 35** that locates within a substantially vertical **drive slot 36** that in some embodiments is angled rearwardly as it progresses downwardly. In cases where an auxiliary bolt is employed, the first arm
15 includes an engaging shoulder as described above.

Integers include means to outwardly bias the latch bolt comprising a **spring 37** to urge the bolt.

Integers further includes at least one **unlatching cam 39** connected by shaft 39A to an associated hand operable **lever 41** (in forms comprising part of a **handle assembly 42** mounted to a face of the door) and having a downwardly extending
20 **unlatching arm 43** that has towards the free end a **driving shoulder 44** that is displaceable in a forward direction by downwards lever operation to rotate the rocker 20 in a cockwise direction to cause the bolt to retract. . Each unlatching cam is preferably supported by a sideways protruding **cylindrical portion 45** that extends
25 into a **circular aperture** in a side of the casing and each such cylindrical portion has a **shaft 47** recess to receive and mate with a **shaft 40** connected to an operable lever of a handle assembly. In some cases an **exterior lever 48** is connected to an outer unlatching cam by an **exterior shaft 49** and an **interior lever 50** is connected to an inner unlatching cam by an **interior shaft 51** while in some cases the shaft are
30 combined as a single shaft.

Integers include an interior hand operable member (that in one form comprises a snib or **locking lever 67**) that is connected by a **spindle 68** to an angularly displaceable **first locking cam 69** having an axial recess mateable with the spindle and supported in the casing by a cylindrical portion that is supported within a
35 circular aperture in a side wall.

Integers further include a **deadlocking slide 73** that in some cases is cooperable with a fully extended bolt to restrain the bolt from being displaced from

the fully extended position – in which case a **leading end 74** of the deadlocking slide engages behind an **engageable shoulder 75** of the bolt – the configuration in which the bolt and slide cooperate is referred to as the deadlocking coinfiguration and when so engaged the deadlocking slide can be said to be in a deadlocking position (this position actually comprising a limited range of slide positions over which the bolt and slide so cooperate) .

Integers further includes an angularly displaceable **first cam 77** a radially protruding **cam arm 78** that [as described in Watts AU 706589 and subsequent divisionals patents which are included herein by reference] comprises part of a **free-rotation-cylinder 79**.

In forms, the deadlocking slide is operably connected to the locking lever by the shaft 68 that in this case is connected to an angularly displaceable **second locking cam 80** supported in the casing by a cylindrical portion that is supported within a circular aperture in a side wall, said second locking cam having a sideways protruding **pin 81** that engages in a **horizontal slot 82** in the deadlocking slide (similarly as 71 and 72).

Where the deadlocking slide is operably connected to the first cam the deadlocking slide has a **drive recess 83** having an **upper drive face 84** on which the first cam arm engages to drive the deadlocking cam towards the deadlocking configuration and having a **lower drive face 85** on which the cam arm engages to drive the deadlocking slide from the deadlocking configuration and an **exit shoulder 86** (preferably comprising an angled face) connected to the upper drive face disposed such that when in the deadlocking configuration the first cam can be disposed such that an end face of the cam 87 (a face of constant radius) is adjacent the exit shoulder such that the force that is applied to the first cam by the deadlocking slide when an attempt is made to move the deadlocking slide from the deadlocking configuration (as might occur in an attempt to rotate the snib lever) has a direction that passes through the pivotal axis of the cam and so the cam cannot be so rotated and the first cam in this configuration restrains the deadlocking slide.

In forms of LOCK/\$ there are two locking modes: a **second mode** as shown in Fig 5 characterized by the first cam arm being within the drive recess and the deadlocking slide having been displaced into the deadlocking configuration by the locking lever or by the first arm (the first arm being operably connected to a cylinder); a **first mode** as shown in Fig 6 characterized by the deadlocking slide fully displaced into the deadlocking configuration and the first cam arm displaced from within the drive recess (the first arm being operably connected to a cylinder) to restrain the

deadlocking slide fully displaced in the deadlocking configuration from which the deadlocking slide cannot be displaced by the locking lever.

Preferably the first cam comprises part of a free-movement-cylinder.

[additional to Version 11 The free-rotation cylinder preferably includes at least one

- 5 compression spring between the cam and a barrel (located within an axial pocket of the cam) to urge the cam against (the opposed barrel or against its associated circlip or against an edge of the housing) to cause increased friction on the cam so that if the cam is displaced through engagement with another member, such as a deadlocking slide, it will come to rest soon after the deadlocking slide ceases to act –
- 10 the friction acting contrary to the rotational inertia of the cam, alternatively the cylinder may include a compressed wave washer located between the cam and the adjacent circlip that retains the adjacent barrel; in either case what is important is that the cam is subject to frictional forces that gives rise to a moment that act to accelerate (negatively) a moving cam till it comes to rest and importantly, to come to
- 15 rest while the cam arm is within the drive recess so that the lock does not become locked in the first locking mode]

- The lock further includes means of operating rods to operate remote locks and more specifically to drive an upper rod 210 upwards and a lower rod 211
- 20 downwards to drive remote locking bolts outwardly. Within the lock there is a angularly displaceable drive annulus 212 supported within a raised annular wing 213 being an extension to the casing side wall – and within this there is the pivotal axis of the lever and drive cam. Protruding from this drive annulus are two pins 205 and 206 engageable by a drive arm 207 connected to the drive cam and they are spaced
- 25 such that when the drive annulus is undisplaced and the lever is undisplaced it abuts 206 and when the lever is lifted to fully displace the drive annulus the arm 207 engages 205 and displaces it and when the lever is then returned to the undisplaced position arm 207 abutts 206 and when the lock is unlatched by pushing the lever down the arm 207 drives 206 to the undisplaced position.

- 30 Drive annulus has a radial slot 220 in which a sideways protruding pin of an upper slide 221 locates to couple them and opposite a radial slot 222 is engaged with a pinned extension 223 of another slide 224 that is shaped to pass over the annulus to terminate towards the rear of the casing to connect to the lower rod.

Forms of Integers

Integers further include the integers described above further configured such that

- 5 • **A)** the latch bolt has a leading portion with curved, chamfer or otherwise profiled sides to facilitate or assist latching wherein the latch is engage able on either side by a strike plate to be inwardly displaced by the strike plate during latching whereby to be and suitable both left hand and right hand hinged doors
- 10 • **B)** the strike plate is designed to deform as described in [Watts 671618] and such a strike plate is included herein by reference.
- **C)** the bolt is supported in the casing between the unlatching cam and the key operable double cylinder as shown
- **D)** dimension L (distance between cylinder and lever axis) is 85.00 mm
- 15 whereby to render the lock compatible with door furniture of common configuration
- **E)** the case length (vertical length when on door - excluding face plate) l_1 is substantially the same as that of common security door locks being 150 MM
- **F)** $l_2 = l_1/2 = 75$ MM; i.e. the bolt is in the middle vertically of the casing (when fitted)
- 20 • **H)** the bolt has an overall length substantially the same as the depth of the casing
- **I)** the depth of the casing is relatively small being 40 ± 3 MM
- **J)** the width of the casing is 15.5 ± 1.5 MM
- 25 • **K)** the bolt is rectilinearly displaceable

[additional to Version 11 **M)** The integers are located so that the lock employs the "industry standard" door preparation for security doors comprising a slotted aperture in the edge of the door and two apertures in each side of the door comprising vertically elongated oval shapes defined by the dimensions 39, 39, R10 and 25.7 of Fig 21]

[additional to Version 11 These configurations impose some difficult boundary conditions on the LOCK/S that observe the conditions because:

- a) a consequence of M) is that the all members passing between the lock and handle sets must pass through one of two oval apertures – these being the rod/s connecting lever/s to cam/s within the casing, the euro-style cylinder, the snib spindle, and the fixing bosses that extend from the underside of an upper portion

and from a lower portion of the handle plate/s through which fixing screws have passage and by which the handle sets are mounted to the door. These bosses preferable extend into the lock casing to help support the lock body and/or to provide adequate threaded engagement for the screws, and

5 b) D) the requirement that dimension L (distance between cylinder And lever axis) is 85.00 mm further qualifies a) above because the cylinder and lever axis must also fall within an oval side aperture in the door.

 c) the above restrictions are extended by E) which requires the casing to have a length of 115 MM and by I) which defines the depth of the casing.

10 d) Because a bolt (by convention and trial) needs to extend at least 1/2" to perform its normal function and because it is preferable for security door locks to extend even further and because it is desirable for the fully extended bolt to be supported by a portion of length not too dissimilar from the extended length H) is proposed, this restriction placing requirements on the integers responsible for bolt
15 displacement and restrictions on integers competing for space adjacent the bolt; and when these restrictions are combined with d) above a consequence arises that a fully retracted bolt extends inwardly to a depth not too dissimilar to the depth of the casing placing restrictions on the length and width of the bolt and restrictions on integers competing for space adjacent the bolt.

20 e) similarly, J) defines a limit imposed by the requirement for the lock body to fit within an extrusion of 16.00 MM nominal width; this restriction on casing width of 15.5 MM (a comparatively small width for a door lock) placing restrictions on the width of the bolt and restrictions on integers competing for space adjacent the bolt.

25 Some embodiments of the invention observe all of the restrictions A) to M) -- these being described below and being shown in the Figures 1 to of 20 LOCK/S]

LOCK/S further include a substantially conventional strike plate that is modified as shown in Fig 17, said strike plate comprising an aperture 130
30 engageable with the extended bolt and including a front aperture edge 131 against which the bolt pushes if one attempts to open a locked door. The aperture is within a substantially flat plate-like portion 132 extending from between a lower slot 133 to an upper slot 133 and connected to a blade 134 that preferably comprises an angled or curved blade. The blade is connected by bridges 135 of reduced cross-sectional area
35 156 and the strike is of a deformable material enabling these bridges to deform without cracking and the reduced area enables deformation to occur at reduced

forces – these characteristics enabling the blade to be angularly displaced about an axis 157 that passes substantially through each bridge.

The bridges connect to fixable portions 151 that include apertures 159 through which screws shanks have passage and by which the fixable portion is attached to a doorjamb. In some types of deformation the fixable portions angularly displace about the screw – this displacement being afforded by the reduced strength of the bridge portion that deforms to accommodate such displacement.

The blade of this design supports the front edge and the blade is only attached at each end (by fixable portions) to the door jamb thereby being deformable like a bow and at moderate forces.

The upper and lower extremes of the plate 132 (that portion between the aperture 130 and the slot 133), portions 140 are of reduced cross-sectional area to enable these portions to deform under low forces so as to deform as the blade portion angularly displaces – these portions engaging the face of the lock as the bridge portions deform to enable the blade to displace.

When a closed and locked door is urged open under the action of a jemmy placed adjacent the bolt, the bolt is forced against the front edge while the lock is simultaneously displaced away from the strike plate. In this case the bolt drags the front edge (while deforming the blade) with it and remains engaged – and in this case the bridges may deform and move closer to the blade to further deform to enable the front edge to further displace.

If the jemmy rests on the strike plate as it is urged open then this action causes the blade to angularly displace to deform the bridge portions. The deformation is as shown in Fig 21

When a closed and locked door is urged open under the action of a jemmy placed adjacent the bolt, the bolt is forced against the front edge while the lock is simultaneously displaced away from the strike plate. In this case the bolt drags the front edge (while deforming the blade) with it and remains engaged with it – and in this case the bridges may further deform and move closer to the blade to further deform to enable the front edge to further displace.

[Additional to Version 11 By this action the bolt is forced against the front edge to displace with it whereby to maintain engagement between the bolt and strike plate while the screws attaching the strike plate to the door jamb are subjected to lower forces and are less likely to pull out than in a conventional strike plate]

BOLT IN PRELATCHED POSITION

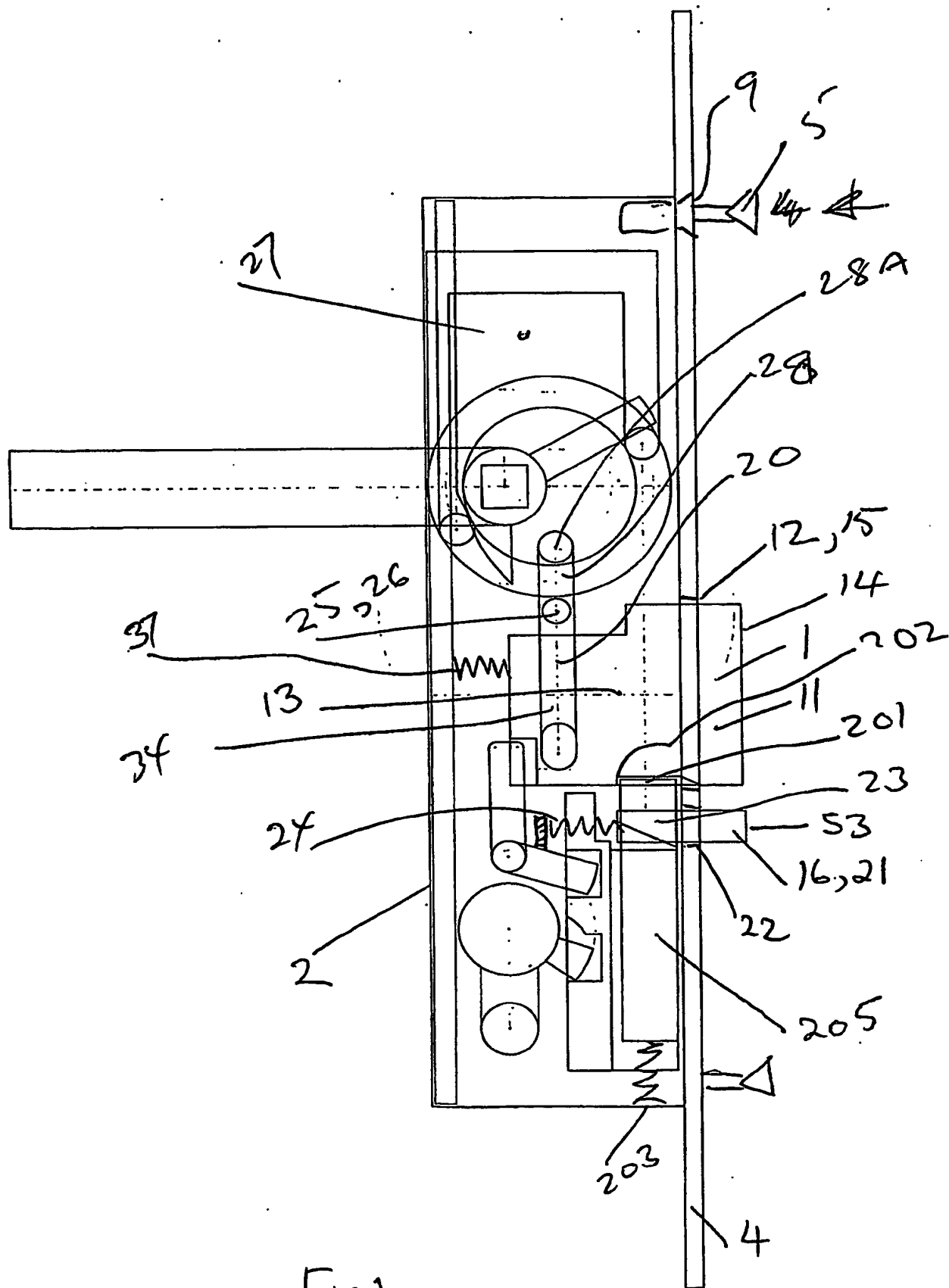


Fig 1

LATCHED IN STRIKE

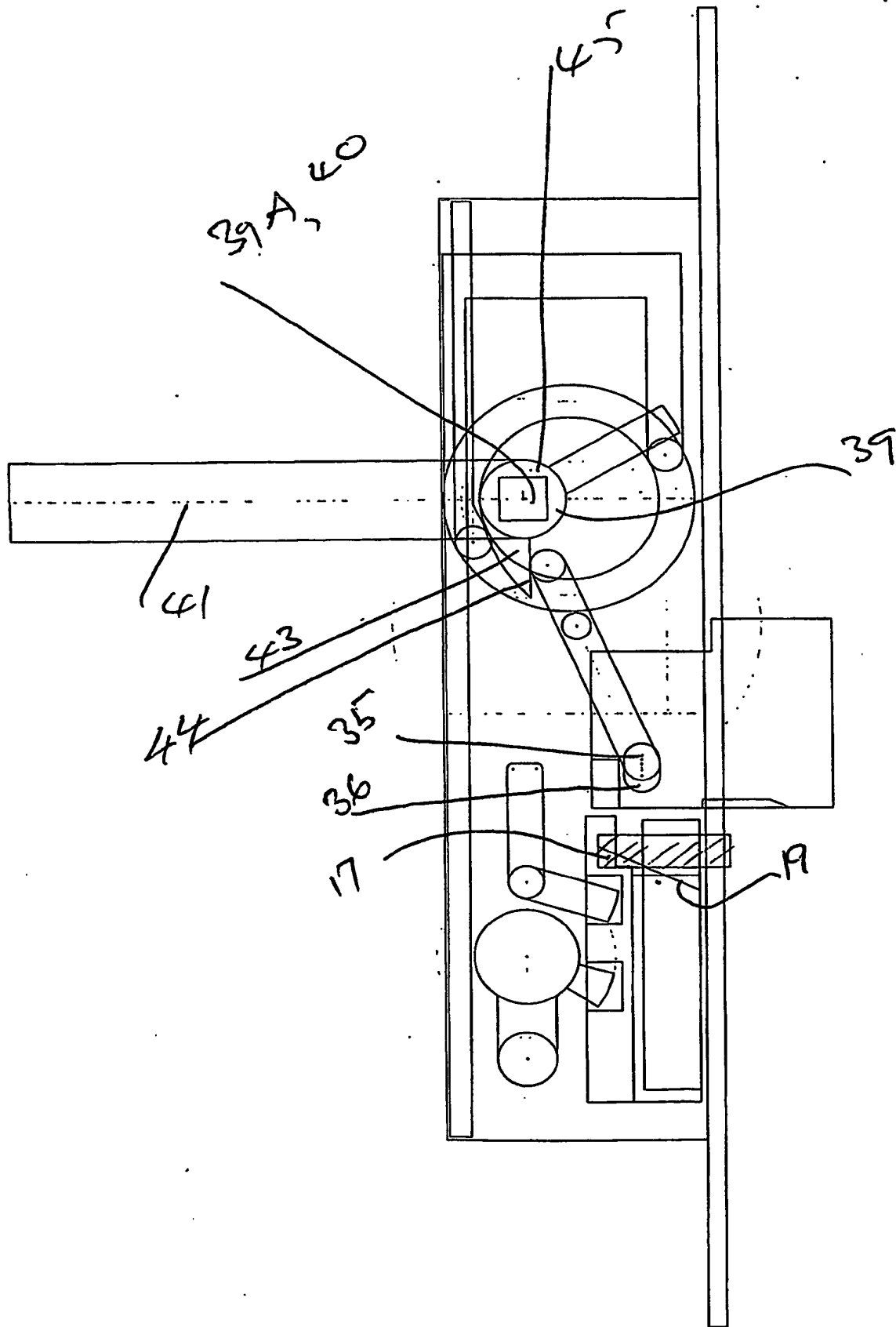


Fig 2

• 22-T DEADLOCKED ONLY

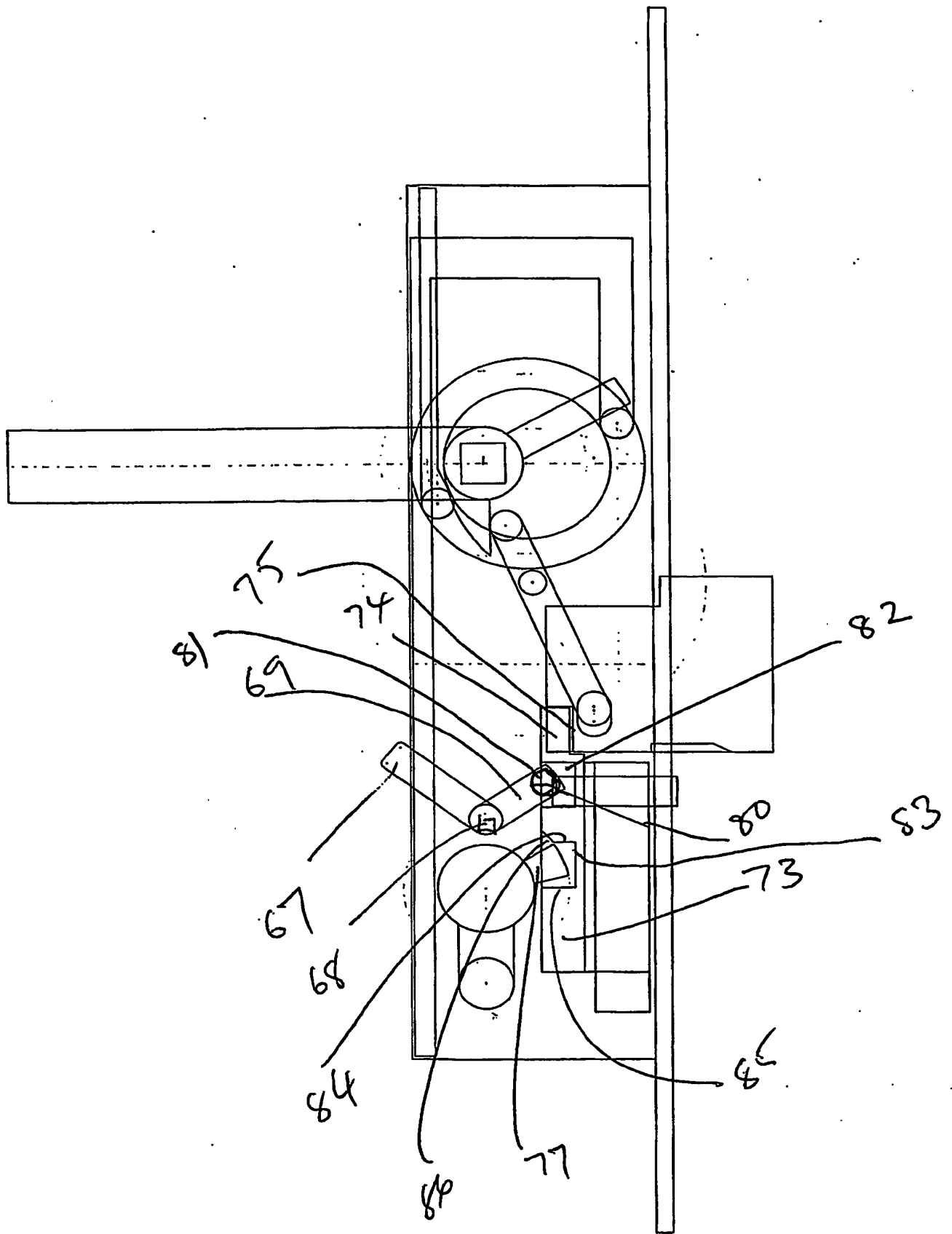


Fig 3

BUJET RETRACTED

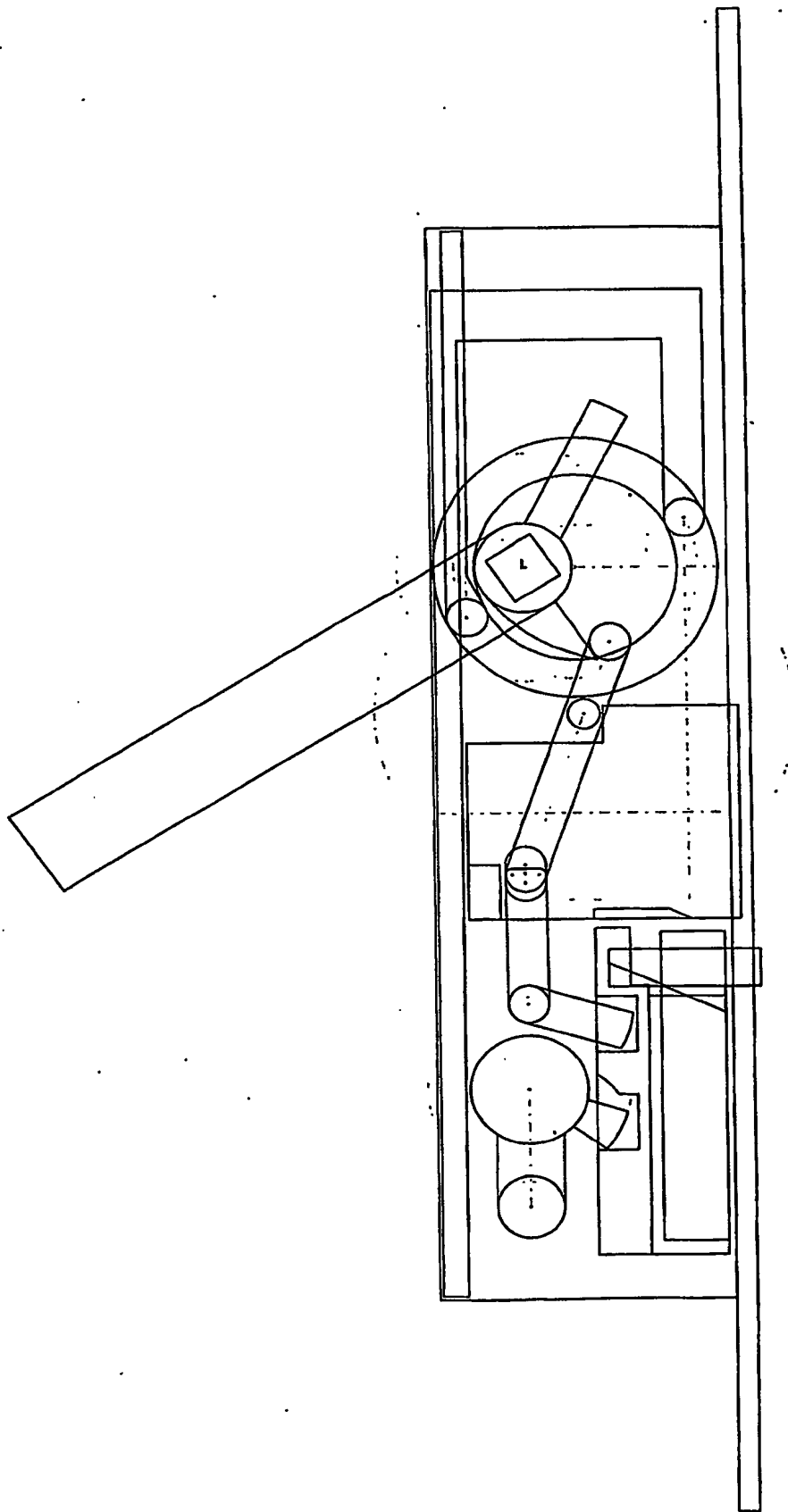


Fig 4

BUT DEADLOCKED AND
RELAYES ACTIVATED.

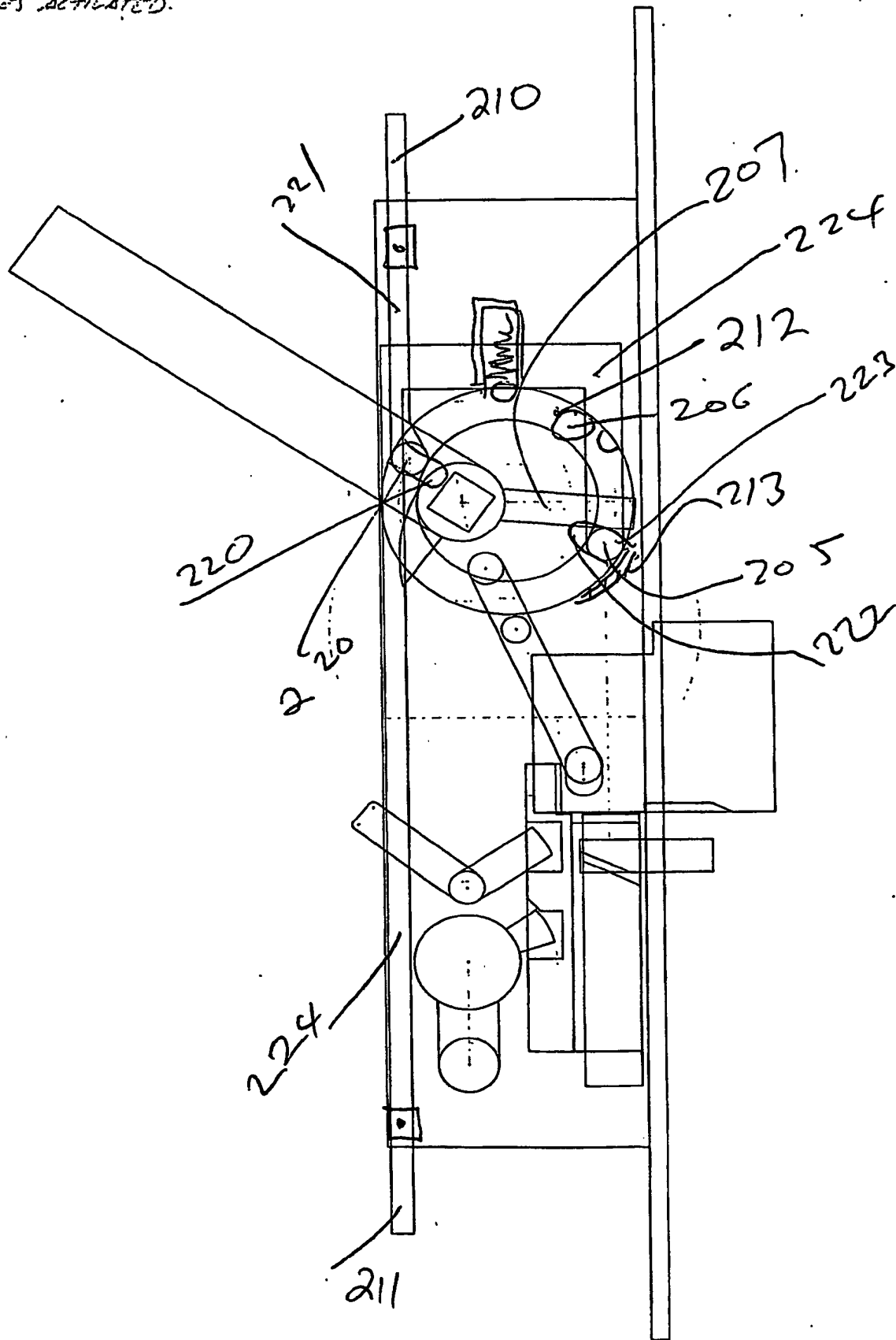


Fig 5

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